

Executing Expert Procurement Strategies

Choosing the right contract vehicle is as important as choosing the right vendor, when outsourcing in today's leaner economy.

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When projects require outsourced production, these goods and services must still adhere to the project's technical, quality, schedule, and cost objectives. After all, a project is only as good as the contracts the project manager negotiates and implements.

Technical and quality objectives are highly related. The organization wants products and services that meet or exceed the project's technical and quality requirements—all within the allotted time schedule. However, meeting the schedule objective should not compromise the quality of the end product or result in unacceptable cost variance. The cost objective is to obtain the products and services at the lowest price consistent with the project's quality, schedule, and other performance requirements. The organization also must attempt to minimize the goods' and services' acquisition and operating costs.

Thus, it is necessary to control the quality, schedule, cost, and technical performance of suppliers and subcontractors in any type or size of project. This requires implementing a proactive, well-organized procurement management methodology, which almost always requires project man-

agement skills and a detailed knowledge of appropriate contracts.

Project Management Methodologies

According to the Project Management Institute (PMI) Project Management Body of Knowledge (PMBOK), procurement management consists of the following processes:

- (1) Procurement planning—determining what to procure and when;
- (2) Solicitation planning—documenting products and services requirements and identifying potential sources;
- (3) Solicitation—obtaining quotations, bids, offers, and/or proposals;
- (4) Source selection—choosing among potential sellers;
- (5) Contract administration—managing the relationship with the seller; and
- (6) Contract closeout—completing and settling the contract, including resolving any open items.



The logical first step in any successful project procurement plan is to identify the different types of products and services needed to complete the project. Knowledge of the resources available in-house, as well as drafting a good cost-analysis plan, will determine the outsourcing plan.

Principal Types of Products and Services

The different types of items requiring procurement can be divided into standard materials, engineered materials, and equipment and services. Each of these categories requires a different approach in managing the procurement function.

Standard Materials and Equipment

Standard materials are items procured for a project using existing commercial standards, vendors' catalogs, or simple descriptions. They do not require preparation of detailed specifications. Examples can include items such as office supplies or common building materials for construction projects such as lumber, concrete, or nails. While the total quantity and monetary value of standard materials on a project can be significant,

procuring these items is relatively simple, and does not require the project manager to be extensively involved.

Equipment also can be classified as standard material if it does not require detailed specifications. Examples include automobiles or office equipment other than computers. Standard materials contracts often contain only one required delivery date for the materials.

Engineered Materials and Equipment

Engineered materials, on the other hand, require detailed specifications. The two types of engineered materials specifications include (1) detailed specifications and drawings, and (2) performance requirements. Detailed specifications and drawings are provided to the vendor specifying how to manufacture or build the engineered material. Performance requirements specify what is needed, but leave the implementation details to the vendor.

A project manager devotes considerable effort to ensure that the procurement process for engineered materials is effective because the process significantly impacts quality, schedule, and cost objectives.

Examples of engineered materials can include items such as:

- Special parts required for the assembly of a missile;
- Customized electronic components;
- Specific valves used in a manufacturing facility; or
- Unusual alloys used in an aircraft or automobile.

Engineered equipment requires that project personnel prepare design specifications. These specifications are usually of the performance type. The supplier normally performs the detailed equipment design. The acquisition cost of major equipment is often a significant percentage of the project budget. Often, all groups on a project are involved with procuring major engineered equipment.

Engineered equipment can include items such as special computers and special telecommunication equipment.

The timely availability of engineered materials can be critical to the completion date of the project schedule. Engineered materials contracts can

include many required completion dates for the work activities performed by suppliers and contractors.

Services

Service contracts involve the performance of work in one or more functional areas of the project by an external organization. They require the project's personnel to prepare a detailed description of the work required from the contractor. These contracts can include the procurement of standard materials, engineered materials, and equipment.

Major service contracts can account for a substantial portion of the effort and cost of completing a project. These contracts require integrating the contractor's personnel with the project management team. Examples of service contracts can include those for engineering, licensing, construction, training, testing, consulting, and marketing.

Appropriate Pricing Strategies

Once all the necessary products and services for project completion are identified, the procurement plan should move to the selection of the appropriate pricing strategies for major contracts. This should be completed in the project's early phases. The pricing strategies selected should balance the risks among the contracting parties. These strategies will have a considerable effect on the organization, as well as the management of control systems required for the project. This effect will increase, as more work is performed by outside service providers.

Project managers can use several pricing approaches for procuring goods and services. Choosing the right approach is important, as selecting an inappropriate one may negatively affect the quality, cost, and schedule of the work performed.

The most common types of contract pricing are fixed-price, unit price, target price, reimbursable with incentive fees, and reimbursable with fixed or percentage fees. Two or more types of contract pricing approaches can be

combined in a single contract. This leads to a relatively large number of pricing combinations that can be used for major project contracts.

Fixed-Price

In a fixed-price contract, the seller agrees to deliver the products or services for one agreed-upon cost. In this case, the buyer is responsible for providing a complete definition of what is required and a schedule for delivery.

The price provided by the seller will include an estimate of its costs and profit. If a project has a long duration, the fixed-price contract might include an allowance for future labor and materials escalation costs. Escalation provisions for labor and materials costs are frequently tied to relevant indices published by the federal government.

Project managers must consider several factors when deciding whether to use a fixed-price contract approach. Before choosing this type of pricing structure, the project should have:

- A complete and accurate definition of the scope of work;
- Explicitly defined technical requirements;
- Clearly stated management requirements; and
- A fixed schedule.

In a fixed-price contract, more than with any other type of contract, using a business analysis approach is key to success. Since the technical preparation will take longer than with other contracts, this preliminary process should be included in the project schedule. However, the detailed preparation will help in ensuring that quality, schedule, and cost objectives are met.

The obvious drawback to the fixed-price approach is that it provides less incentive for a contractor to minimize schedule duration. In addition, fixed-price suppliers and contractors often

minimize quality management activities to reduce costs, which can result in quality problems. Therefore, the project manager needs to maintain close oversight during the project. Also, renegotiating the price might be necessary since fixed-price contractors are reluctant to proceed with any work associated with a change request before resolving cost. These negotiations might negatively affect the schedule.

If the contract scope is well defined, the potential for significant changes is low. Without the risk of significant changes, the schedule for performing the work is unlikely to change. In this case, a fixed-price contract is usually the best approach. Most standard materials are procured using a fixed-price contract approach, since the scope of work and schedule objectives are easy to define.

If the design of engineered materials can be finalized prior to needing to acquire them, they also can be procured using a fixed-price approach. In addition, engineering equipment could be acquired using a fixed-price contract if it is possible to articulate sufficient performance objectives.

Unit-Price

In a unit-price contract, the seller commits to providing each unit of work defined by a buyer for a fixed-price-per-unit of work. In this scenario, the seller carries the risk of the cost per unit and the buyer assumes the risk of quantity growth in the number of units.

Usually, in a unit-price contract, the units of work specified by the buyer are large in quantity and similar in nature. Since the unit prices are fixed, the buyer specifies the time frame during which the work will be performed.

Unit-price contracts are appropriate when the units of work can be well defined but the total quantities are uncertain. Certain standard materials procured in large quantities are provided under unit-price contracts. Engineered materials also are procured with unit-price contracts when

the design is incomplete. Service contracts can use unit pricing, provided the scope of work lends itself to the approach.

As with fixed-price contracts, unit-price contracts require an accurate description of the work's complexity. However, unit-price contracts also require an estimate of the probable quantity of units. In addition, this type of contract also requires an accurate definition of when the units of work will be delivered or installed, unless the contract contains an escalation clause. Unit-price contractors are reluctant to increase personnel, overtime, or shift work to accelerate the schedule of their work.

When using unit-price contracts, managers should remember that (1) unit-price and cost-reimbursable work should not be included in the same contract, and (2) unit-price contracts require an accurate method of reporting completed work units.

Target Price

In a target-price contract approach, the seller commits to providing goods or services defined by a buyer for a target price. The target price is not fixed, since the seller does not assume all of the risks associated with performing the defined work for the target price. In this scenario, the buyer and the seller share the cost savings and cost overrun.

Target-price contracts are appropriate when there is a high level of uncertainty associated with the scope of work to be performed. Although these contracts do not need as comprehensive and detailed a specification of the scope as the fixed-price approach, target-price contracts still require some level of knowledge of the scope of work for the estimator to establish a target price.

To successfully manage a target-price contract, the buyer must monitor the contractor's cost performance in a manner similar to reimbursable contracts. This will ensure that the final contract price is close to the target price.

A drawback to target-price contracts

is that these contracts do not provide strong incentives for schedule performance. Therefore, target-price contracts are not frequently used for procuring standard materials, engineered materials, or equipment, since subsequent work that must be performed depends on the timely delivery of these types of products.

Reimbursable-with-Incentive-Fee

In a reimbursable-with-incentive-fee contract approach, the seller commits to providing goods and services specified by the buyer for the seller's actual costs, plus a fee based on performance. In general, performance incentives are for schedule, cost, and quality objectives. Incentive fees also can be combined with fixed fees.

If schedule is a high priority, incentive-type contracts are more effective than other contract pricing approaches. Incentive contracts can be used to motivate the seller to control costs and strive for outstanding technical or schedule performance. These contracts provide the foundation on which to build win-win outcomes for the buyer and seller.

The performance incentives used in reimbursable-with-incentive-fee contracts should be balanced. Proper selection of the contract vehicle and structuring of related incentives minimizes common problems—such as cost overruns, schedule delays, and failure—to achieve expected results.

Common schedule performance objectives can be developed for multiple project contractors. Reimbursable-with-incentive-fee contracts can be awarded more quickly than fixed-price or unit-price contracts, and are most frequently used for service contract work. These contract types are not commonly used for acquiring standard materials, engineered materials, or equipment.

Reimbursable-with-Fixed- or Percentage-Fee

In a reimbursable-with-fixed- or percentage-fee contract approach, the seller commits to providing products and services requested by a buyer for

actual costs, plus a fee. A fixed fee could be used, which is based on a rough estimate of the goods' and services' value that may be included in the contract. Or, a percentage fee could be used, which is calculated by multiplying an agreed-upon percentage by the actual costs of the products and services furnished by the seller.

This type of contract commonly is used when it is difficult to define the scope of work well enough to support a fixed- or unit-price contract approach. The advantage of this type of pricing contract is that it requires less preparation time prior to signing a contract.

Several issues are associated with a reimbursable-with-fixed- or percentage-fee contract approach:

- It is one of the most difficult contracts to administer;
- It requires extensive buyer involvement to control costs;
- Cost limits should be included;
- Changes in conditions have little effect on these contracts, since the contractor is reimbursed for any additional costs incurred in implementing a change;
- This approach is seldom used for procuring standard materials, engineered materials, and equipment; and
- This approach often is used for major service contracts where it is difficult to define the scope of work in detail.

Evaluation of Suppliers

The identification, evaluation, and management of suppliers and contractors are important factors in achieving project objectives. The effectiveness of the supply base influences the overall project's success. The process used to identify and evaluate qualified bidders is an important step, since the quality of the project's end result is only as

good as the suppliers of subcontracted work or products.

The procurement department can use numerous sources to develop preliminary lists of potential bidders for engineered materials, equipment, and service contracts. Some of the most commonly used sources include company personnel, project contractors, supplier catalogs, and trade registers and directories.

Procurement Department Files

The procurement department's files are a valuable source of information for identifying potential bidders. Procurement personnel must examine these files to identify completed or in-progress contracts similar to the one on hand.

These files should include evaluations of the suppliers' and contractors' technical performance, budget, and schedule. If these evaluations are missing, it may be possible to contact company personnel acquainted with their performance. In addition, a supplier's or contractor's performance will change over time. Thus, it is important to update these evaluations periodically, or to use current sources of information to assess performance.

Qualified Bidder Lists

Many organizations and government agencies maintain lists of suppliers and contractors qualified to provide or perform specific products or services. These lists can save time for procurement personnel. However, the procurement department needs to update these lists periodically. Frequently, these lists require cross-functional involvement, which may be expensive to prepare and maintain.

Company Personnel

Certain company personnel who have been working with specific suppliers and contractors may be able to provide extremely valuable, firsthand information about the companies' performance. Different departments can assess various capabilities of suppliers and contractors. For example, the engineering department can

assess technical capabilities, while the operations department can assess the furnished equipment. Locating company personnel, who have experience with these suppliers and contractors, and ensuring objectivity of these assessments are two of the major challenges associated with this source.

Project Contractors

The procurement group often asks suppliers and contractors already working on a project to nominate qualified bidders for other procurement packages. For example, engineering contractors preparing specifications and drawings for engineered equipment or material can recommend qualified bidders for these items based on their own experiences.

A major pitfall associated with this source is its subjectivity. The contractor providing these evaluations may be a potential source for performing the work with its own workforce.

Supplier and Contractor Sales Personnel

Sales personnel for suppliers and contractors make frequent contacts with procurement departments to promote their company's products and services. Although the sales person's opinion of their organization's superiority

is obviously biased, keeping in contact with the sales person offers the project manager good information about any new capabilities of established vendors, and can help to alert the manager about new vendors.

Supplier Catalogs

The majority of suppliers publish catalogs of their material and equipment, which can provide valuable technical information. Procurement departments should maintain libraries of supplier catalogs for material and equipment. Procurement personnel can use this library to identify lists of potential bidders.

Maintaining these libraries and updating them is a time-consuming process. However, the Internet provides a unique opportunity to assist with this process, since the latest versions of these catalogs are usually available online and are updated more frequently than print versions.

Trade Registers and Journals, Directories, and the Yellow Pages

Trade registers and directories provide information on the addresses and products of different suppliers and contractors indexed by commodity, manufacturer, and trade name. Many trade journals also contain information



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about suppliers and contractors for a specific industry. These journals often publish as part of their subscription an annual directory issue, which can be an invaluable source of information about new vendors. These publications also review vendors, and can be a good vendor evaluation tool. Procurement departments should subscribe to these journals to develop lists of potential bidders.

Finally, the *Yellow Pages* and other similar directories are useful to identify suppliers of standard materials, but are not suitable to identify suppliers and contractors for engineered materials, equipment, and service contracts.

Conferences and Trade Shows

Trade shows are valuable sources of information for procurement departments. During these events, companies provide information about their products and services. Vendors demonstrate their capabilities, and give buyers the chance to meet key contact people to forge relationships.

Suppliers and Contractors

Prequalifying potential contractors to narrow the list of sources requires extensive inquiry into the firm's technical, quality, cost control, schedule control, and other management capabilities, as well as its financial situation.

Technical Capability

Project managers can use several approaches to evaluate the technical capability of potential suppliers and contractors. First, the manager can assess the source's performance on completed or in-process projects similar to the current project. The source also can explain its technical program, basic design program, and technical procedures for design control. Second, the manager must assess the current technical staff, including the staff members' educational backgrounds and their technical experiences. Finally, a visit to the source's technical site will be beneficial, since it enables the manager to observe the facility's layout and equipment.

Quality Capability

The project manager must assess the quality programs that the suppliers and contractors will use to ensure that their design, procurement, manufacturing, or construction activities comply with the technical and quality requirements in contracts. The manager also must assess (1) quality procedures, which outline the supplier's quality activities; (2) training programs, which ensure that personnel are well versed in the quality procedures; and (3) quality control activities, such as inspections, which are used to ensure that technical and quality requirements are achieved.

Cost Control Capability

If the project manager is considering the supplier for a fixed-price contract, concerns are limited to the schedule of payments, invoice, escalation, and accounting requirements. However, if the provider will be working under a reimbursable type contract, the project manager needs to evaluate the cost control programs for labor and material costs. This assessment should include:

- The provider's estimating and budgeting capability;
- Types of cost control reports the contractor will use to compare budgeted to actual performance;
- How to control personnel increases;
- Overtime;
- Shift work; and
- Other activities that affect project cost.

Schedule Control Capability

When evaluating the provider's schedule control capability, the project manager can use several approaches. First, the manager can ask the contractor to submit duration for design, procurement, manufacturing, or construction activities that the company achieved on similar, previous contracts.

Such project snapshots will provide information about the owners of these projects, which the project manager or procurement personnel can contact to obtain schedule performance evaluations. Second, the project manager can assess the supplier's programs for controlling the schedule, an assessment that should include the types of reports used to monitor and control the schedule. Finally, the project manager needs to assess the provider's responsibilities for schedule acceleration costs required to compensate for late completion of schedule activities.

Other Management Capability

Potential contractors present their proposed organizations for performing the work on a new contract. The project manager needs to assess the contractor's estimated staffing requirements, the experience and availability of key personnel, and the maturity of the firm's project management processes.

Financial Evaluation

A provider in a weak financial position threatens a project, since financial problems may affect the contractor's capability to perform. The following is a guideline for financial evaluation. It might be helpful for project managers to create a template form that can be used for future evaluations.

Business Summary

- Annual sales
- Net worth
- Number of employees
- Primary business
- Name, address, and chief officer

Special Events

- Lawsuits
- Fires
- Loss of a major customer

- New product development

Financial Profile

- Return on net worth
- Quick ratio
- Current ratio
- Assets to sales
- Total liabilities to net worth

Risk Summary

- Degree of financial stress
- Sales, debt, and net worth

Operation

- Physical facilities
- Size and locations of plants and warehouses
- Proximity to transportation facilities
- Number of employees
- Equipment
- Active seasons

History

- Business background
- Founding or incorporation date
- Founding executives or partners
- Previous experience of the owner, partners, officers, and directors

Public Findings

- Legal proceedings against the firm

Payment Trends

- Credit report
- Bill-paying history

Continuous Evaluation and Improvement

The project manager, with the help of the procurement department and other functional managers, should continuously evaluate and improve the organization's supply base. To organize data collected on these potential suppliers, organizations can categorize suppliers into:

- (1) Conditional—supplier whose performance does not meet minimum standards, or a new supplier, who has not yet established a performance history;
- (2) Approved—supplier meets minimum standards and can supply components for existing products but not new ones;
- (3) Preferred or Key—supplier has proven ability to meet sourcing objectives and a mutual commitment to a continuing, long-term relationship; and
- (4) Strategic Alliance—supplier is characterized by integrated management planning and scheduling, shared technology and plans, access to each other's financial information, and a commitment of resources.

The identification, evaluation, and motivation of the proper sources ensure that the organization will receive procured products or services that meet or exceed set quality criteria, adhere to agreed-upon quantities, meet the project's completion schedule, and help meet budget goals.

Success Through Expert Strategy

In today's leaner economy, outsourcing products and services has become particularly important to keep projects within budget and on schedule. The main objective of the procurement function is to get the appropriate material or service at the right time for a minimum cost. Choosing the right vendor or equipment is crucial when investing a large amount of

capital for major special equipment needed for one particular project. In addition, purchasing special services can allow the project to be completed within schedule without having to add personnel or overtime hours that would impact the final project cost.

However, the right vendor might still not be enough to ensure success; the project manager's ability to choose the right contract also is key to running a smooth project. Choosing the correct contract approach based on product type and preparation for the project can help to ensure quality, schedule, and cost objectives are met. Failure to comply with the contract quality or schedule requirements can increase the project's costs, in addition to causing quality problems and schedule delays. Special management techniques are needed for each type of contractor to adequately control the vendor's performance.

The entire process, from identifying necessary products or services to selecting project-appropriate contracts to selecting the right supplier, are all key to the purchasing process. The supply base and its overall effectiveness affect profitability, competitiveness, time to market, new product success, and overall business performance. *CM*

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A Guide to the Project Management Body of Knowledge. Project Management Institute, Newtown Square, Pennsylvania (2000).